

What is claimed is:

1. A method for determining a zeta potential generated between a channel wall and a fluid, the method comprising:

5 (a) injecting an electrolyte solution into a first inlet of a T channel, which is provided with first and second inlet electrodes and a grounded outlet electrode, and a mixed solution of the electrolyte solution and a fluorescent dye into a second channel of the T channel and maintaining a steady-state of the two solutions;

10 (b) applying a direct current electric field from the first and second electrodes to the outlet electrode to form an interface between the electrolyte solution and the mixed solution;

15 (c) applying an alternating current electric field from one of the two inlet electrodes to the outlet electrode to oscillate the interface; and

(d) measuring an amplitude of oscillation of the interface and determining the zeta potential from the standard relationship between the zeta potential and the amplitude.

2. The method according to claim 1, wherein the amplitude of oscillation of the interface is measured using a fluorescence microscope.

20 3. The method according to claim 1, wherein the direct current electric field is in the range of 100 to 2,000 V/cm.

25 4. The method according to claim 1, wherein the frequency of the alternating current electric field is in the range of 1 to 10 Hz.

5. An apparatus for determining a zeta potential generated between a channel wall and a fluid, the apparatus comprising:

(a) a T channel comprising first and second inlets and an outlet;

30 (b) first and second inlet electrodes, and an outlet electrode, which are installed at the first and second inlets, and the outlet, respectively;

(c) electric field application means for applying an electric field between the first inlet electrode and the outlet electrode and between the second inlet electrode and the outlet electrode;

(d) two reservoirs, one of which is connected to the first inlet to feed an electrolyte solution and the other is connected to the second inlet to feed a mixed solution of the electrolyte solution and a fluorescent dye; and

5 (e) means for measuring an amplitude of oscillation of an interface between the electrolyte solution and the mixed solution.

6. The apparatus according to claim 5, wherein the means for measuring the amplitude of oscillation of the interface is a fluorescence microscope.